
Exhibit B

**Surveillance Management System (SMS)
Requirements**

October 29, 2002

Rev D

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1. Introduction

The Surveillance Management System (SMS) will be composed of a ruggedized workstation, keyboard, and trackball. The SeaVue™ Radar Control Unit (RCU) can be used to operate the radar system in the event of an SMS failure. The SMS workstation will enable the POS 14 operator to control the SeaVue™ mission radar system, view radar and FLIR video, to generate and manage tactical graphical data, and to display radar and SMS operational status.

2. SMS Required Capabilities

The SMS shall provide the following required capabilities:

- a) Tactical Situation Display window (as specified within this document)
- b) Real-time display of radar video and FLIR video in separate, moveable and re-sizeable windows
- c) Overlay coastline map, tactical data, and graphical overlays on radar video
- d) Display of data windows (content specified within this document)
- e) Full operational control of SeaVue™ Radar
- f) Full suite of tactical display aids (as specified within this document)
- g) Windows based user interface

3. SMS Display Presentation

The SMS shall provide SXGA video to the GFE flat panel display. The SMS shall provide the operator with the following graphical windows, data windows, and tactical aids:

1.1 Graphical Windows

1.1.1 Tactical Situation Display Window

The SMS shall provide tactical situation display video and shall be a graphical presentation of database information referenced to geographic location. Selectable range scales shall allow the operator to select a display scale appropriate to the tactical situation. The operator shall be able to use the SMS to control the display of world coastline maps, radar Track-While-Scan (TWS) target annotation, own aircraft symbol, SMS cursor symbol, and a complete suite of tactical and display aids (as specified within this document).

1.1.2 Sensor Video Windows

1.1.2.1 Radar Video Window

The SMS shall receive and display the Radar's Planned Position Indicator (PPI) video and B-Scan videos in separate moveable, re-sizeable windows in the tactical display area. The default size for both windows shall be 1:1 (relative to the frame-grabbed image), with the B-Scan window located near the upper right portion of the PPI window (as shown in figure 2). The SMS shall allow for this default window size to be restored upon command. The SMS shall overlay tactical display aids (as specified in paragraph 3.3) on top of the PPI video. The Radar PPI video window shall have the following information displayed in the window's header banner: radar mode, range scale, and antenna tilt. (This data is sent from the radar via RS-422 and specified in radar RS-422 Data Output ICD). The B-Scan window shall only be displayed when active (as specified in Radar Control ICD) and requires no overlays.

1.1.2.2 FLIR Video Window

The SMS shall receive FLIR sensor, RS-170 format, video, and display it in a separate moveable and re-sizeable window in the display area. The FLIR video shall not require SMS generated tactical overlays.

1.2 Data Windows

The SMS shall provide the following data windows to the GFE tactical display:

1.2.1 Aircraft Data Window

This window shall continually display updated aircraft data. The data shall include aircraft latitude and longitude, aircraft true heading, aircraft true airspeed, and aircraft altitude. (This data is sent from the radar via RS-422 and specified in radar RS-422 Data Output ICD). This window shall always be on top.

1.2.2 Radar Status

The Touch Entry Display (TED), also referred to as the Programmable Entry Panel (PEP), shall display radar status information. The data shall include receiver gain, graphics intensity, and the current state of all radar ON/OFF toggle command bits. The data shall also include: radar mode, range scale, and antenna tilt.

1.2.3 Track While Scan (TWS) Data Window

This window shall display information for an operator designated TWS target. The data shall include the specified target track ID number, target range, target bearing, target latitude, target longitude, target speed, target course, and target time-to-go. (This data is sent from the radar via RS-422 and specified in radar RS-422 Data Output ICD). This window shall only be active when commanded by the operator.

1.2.4 Alerts Window

This window shall display radar warnings and fails and SMS operator alerts.

1.2.5 Tableau Data Window

This window shall display mission database information. As a minimum, these *shall* include:

- Mission and flight crew information
- Mission waypoint data
- Detection and Track updates
- List of failure alerts (history)
- List of captured “frame grabbed” images

A tableau editing function shall enable the operator to make some selected modifications to the database.

1.3 Tactical Display Aids

The SMS shall provide operator tactical display aids. These tactical aids shall be able to be displayed as overlays on the radar PPI video. These overlays shall be able to be selectively turned on and off. The tactical aids shall include:

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- a) Coastline maps
 - b) Target symbology
 - c) TWS track contact annotation
 - d) Data cursor with text annotation or associated data windows (range/bearing to cursor, latitude/longitude at cursor, range/bearing of designated point to cursor)
 - e) User generated vectors / lines
 - f) User defined reference points
 - g) User defined text
 - h) Rings (radar horizon, and user defined circles)

4. SMS Operator Control

The SMS shall use a ruggedized keyboard and trackball, and an external touch entry display to access all SMS and radar commands.

5. Equipment

The SMS shall use ruggedized commercial off-the-shelf (COTS) equipment.

The SMS processing unit shall be an IBM compatible computer running under the Microsoft Windows 2000 operating system. A removable mass storage device is required. A re-writeable CDROM is required. Any required interface cards shall be available commercially (i.e., not internally developed). The approximate weight of the computer is ~50-lbs., and shall fit into a standard 19" aircraft rack mounting fixture.

Input devices shall consist of a keyboard and trackball, and Touch Entry Display (TED). The SMS display shall be a GFE provided color flat-panel display. The total weight of the keyboard, trackball, and TED is approximately 20-lbs.

6. Auxiliary Equipment

- A video converter (Folsom Research ViewMax) capable of converting STANAG-3350B video from the output of the SeaVue™ Radar and output RS-170 video to the aircraft video distribution system.
- Video Converter, Kramer FC-4041C, approximate weight 5.8-lbs., approximate size 2.5"-H x 19"-W x 7"-L.

7. Interfaces

The required SMS / Radar / FLIR interfaces on the SPECIAL PROJECTS aircraft are shown in Figure 1 below.

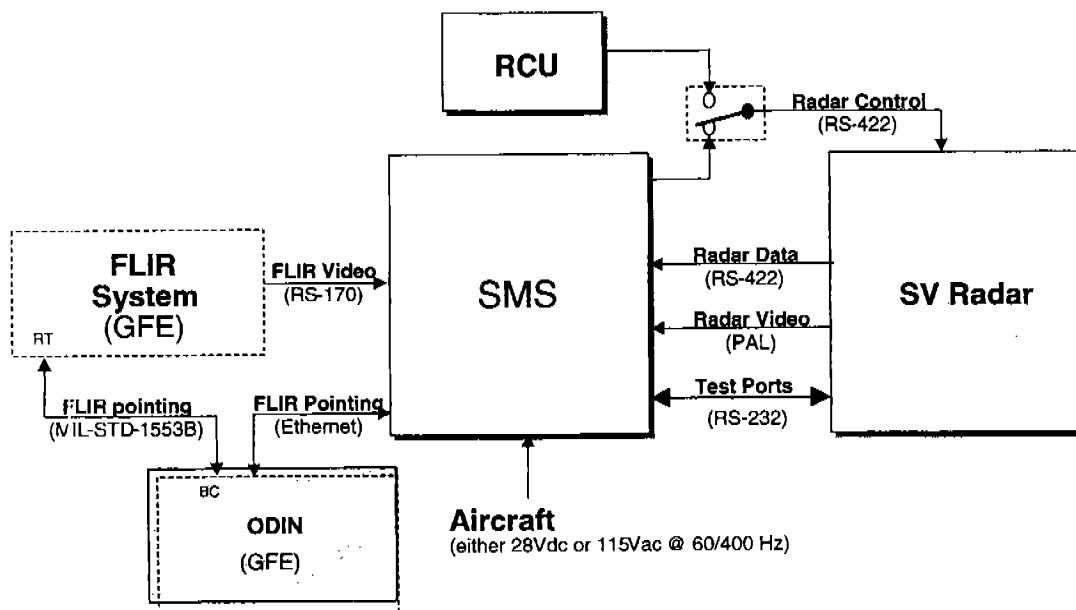


Figure 1 - SMS/Radar/FLIR Interfaces on the SPECIAL PROJECTS Aircraft

1.4 FLIR:

1.4.1 Video

The SMS shall receive FLIR RS-170 video and display it in a separate video window.

1.4.2 Radar-to-FLIR Handoff Command

The SMS shall provide pointing to the FLIR via the ODIN mission computer using an Ethernet interface. The pointing information shall be Latitude and Longitude of the area of interest. The data content and formats are specified in the SMS ICD.

1.5 SV Radar Video:

The SMS shall receive radar PAL video and display the PPI and B-Scan in a separate video window.

Note: The radar video conforms to standard 625-line PAL video format. The radar internally processes a 568 x 568-pixel PPI window and a 170 x 170 pixel B-Scan window. These are output at full resolution as 574 active lines by 770 pixels display. The radar video is graphically illustrated in the figure 2.

Sea Vue Radar 625-line PAL video Format (574 active lines x 770 pixels)

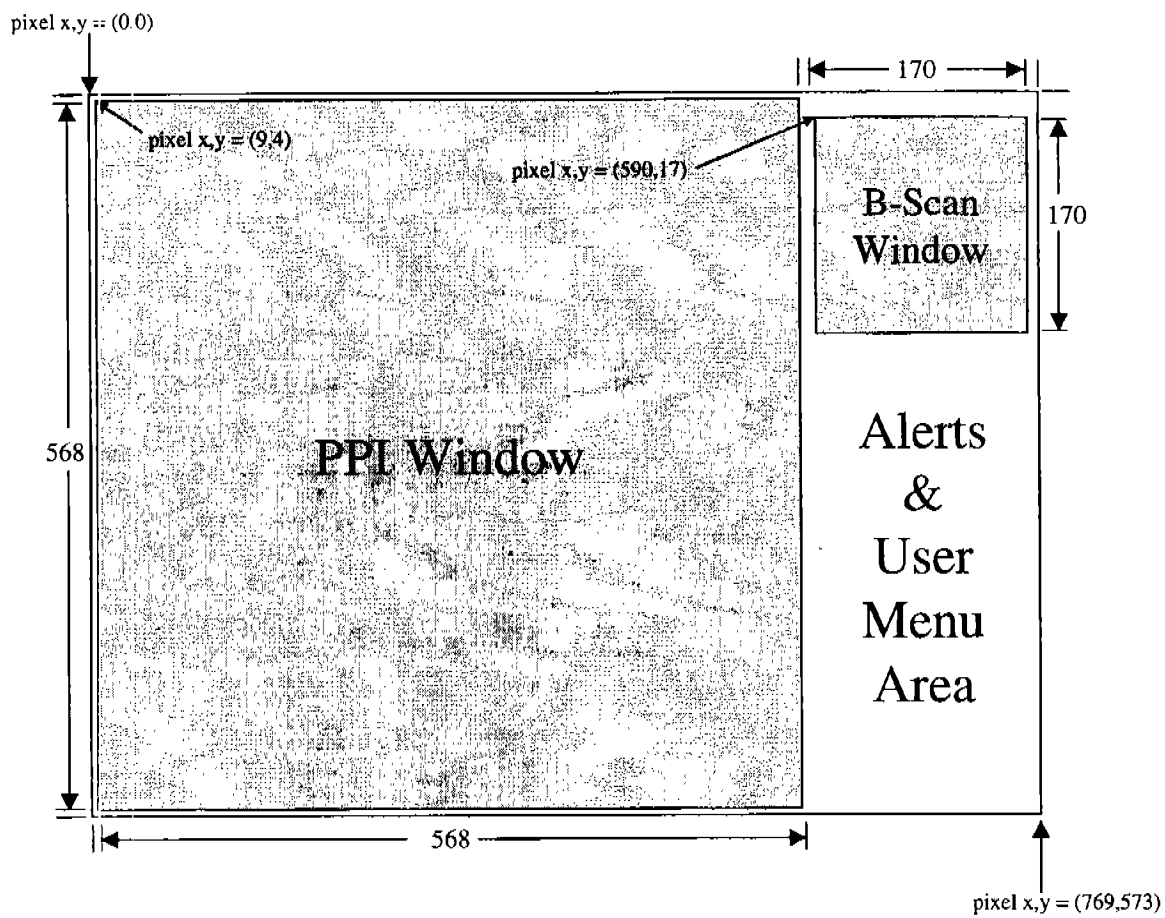


Figure 2

1.6 SMS / Navigation System Interface

The SMS shall receive the following aircraft data directly from the radar, as specified in the SeaVue™ Radar Data Output ICD, via an RS-422 interface:

- Aircraft Latitude
- Aircraft Longitude
- Aircraft Heading
- Aircraft Altitude
- Aircraft Speed

If aircraft navigation data cannot be obtained (such as when the radar is powered off), the SMS shall be capable of displaying tactical maps/plots centered at a geographic location designated by the operator.

1.7 SeaVue™ Radar RS-232 Interface

The SeaVue™ radar has two (2) separate RS-232 interface ports that can be used for test / data collection purposes. The SMS shall provide a minimum of four serial communication ports that correspond to standard RS-232 protocol. The contractor shall specify the memory map and IRQ information for these ports, but the software that communicates with these ports shall not be required for normal operation of the radar or SMS.

1.8 SeaVue™ Radar RS-422 Control Interface

The SMS shall control the radar via an RS-422 interface. The command requirements and formats are specified in the Sea Vue Radar Control ICD.

1.9 SeaVue™ Radar RS-422 Data Output Interface

The SMS shall receive and process all radar status, aircraft data, and TWS track data sent from the radar via an RS-422 interface. The data content and formats will be specified in the SeaVue™ Radar Data Output ICD.